APPENDIX B
Individual Sub-Layer Maps

Table of Contents

Chapter	Page
Diversity layer	176
Rarity layer	177
Sustainability layer	179

List of Figures

Figure	Page
Figure B1. Map of diversity sub-layer: appropriateness of land cover. This map is used to produce the map of the diversity layer (Figure 5).	181
Figure B2. Map of diversity sub-layer: contiguous size of undeveloped land. This map is used to produce the map of the diversity layer (Figure 5).	182
Figure B3. Map of diversity sub-layer: Shannon land cover diversity index. This map is used to produce the map of the diversity layer (Figure 5).	183
Figure B4. Map of diversity sub-layer: ecologically significant stream segments. This map is used to produce the map of the diversity layer (Figure 5).	184
Figure B5. Map of rarity sub-layer: vegetation rarity. This map is used to produce the map of the rarity layer (Figure 6).	185
Figure B6. Map of rarity sub-layer: natural heritage rank. This map is used to produce the map of the rarity layer (Figure 6).	186
Figure B7. Map of rarity sub-layer: taxonomic richness. This map is used to produce the map of the rarity layer (Figure 6).	187
Figure B8. Map of rarity sub-layer: rare species richness. This map is used to produce the map of the rarity layer (Figure 6).	188

Figure B9. Map of sustainability sub-layer: contiguous land cover type. This map is used to produce the map of the sustainability layer (Figure 6). 189

Figure B10. Map of sustainability sub-layer: regularity of ecosystem boundary. This map is used to produce the map of the sustainability layer (Figure 7). 190

Figure B11. Map of sustainability sub-layer: appropriateness of land cover. This map is used to produce the map of the sustainability layer (Figure 7). 191

Figure B12. Map of sustainability sub-layer: waterway obstruction. This map is used to produce the map of the sustainability layer (Figure 7). 192

Figure B13. Map of sustainability sub-layer: road density. This map is used to produce the map of the sustainability layer (Figure 7). 193

Figure B14. Map of sustainability sub-layer: airport noise. This map is used to produce the map of the sustainability layer (Figure 7). 194

Figure B15. Map of sustainability sub-layer: Superfund National Priority List and state Superfund Sites. This map is used to produce the map of the sustainability layer (Figure 7). 195

Figure B16. Map of sustainability sub-layer: water quality. This map is used to produce the map of the sustainability layer (Figure 7). 196

Figure B17. Map of sustainability sub-layer: air quality. This map is used to produce the map of the sustainability layer (Figure 7). 197

Figure B18. Map of sustainability sub-layer: RCRA TSD, corrective action and state VCP sites. This map is used to produce the map of the sustainability layer (Figure 7). 198

Figure B19. Map of sustainability sub-layer: urban/agriculture disturbance. This map is used to produce the map of the sustainability layer (Figure 7). 199

The figures displayed in this appendix represent the individual sub-layers that constitute the main layers and ultimately the composite. The data for each sub-layer was calculated at the ecoregion level. However, for GIS technical reasons and presentation purposes, the legends of Appendix B figures reflect statewide ranking (i.e., the red shaded areas indicate the particular range of values statewide). This is different from the report text where sub-layers were combined and the results presented by ecoregion (i.e., the red areas indicate the 1%, 10%, etc. in that particular ecoregion). The data is the same (i.e., all calculated by ecoregion), only the presentation legend and scaling is different. On some figures, there were enough cells with a score of 100 that there was no way to separate the top 1% and top 10% (the top 1% of cells scored 100 and the top 10% of cells also scored 100), for example, road density (Figure B13).

Diversity layer

The statewide trend shows a higher level of appropriate vegetation in Rio Grande Plain, Stockton Plateau, Chihuahuan Desert Basin and Range, the southern part of Rolling Plains ecoregion. The Mid Coastal Plains Western Section, Oak Woods and Prairies, and Coastal Prairies and Marshes ecoregions show more disturbance in terms of what type of vegetation cover would exist without human influence (Figure B1). The amount of potential natural vegetation is also related to the amount of human disturbance, i.e. issues concerning sustainability of the area (see Sustainability section below).

There are many areas of larger tracts of undeveloped land including Chihuahuan Desert Basin and Range and Stockton Plateau ecoregions, portions of the Rolling Plains ecoregion, Rio Grande Plain ecoregion, northern Texas High Plains ecoregion (around the Canadian River),

southern portion of the Edwards Plateau, Mid Coastal Plains Western Section, and Coastal Plains and Flatwoods Western Gulf Section (Figure B2).

The Shannon land diversity index map shows higher levels in the Blackland Prairie, Oak Woods and Prairies, Mid Coastal Plains Western Section, and Coastal Plains and Flatwoods Western Gulf Section ecoregions which might seem contradictory to the previous measure of contiguous land cover. Figure B3 shows that there are more, different types of undeveloped land cover in the eastern part of the state, covering several ecoregions and not as many undeveloped land cover types (nor as well dispersed), in the northern and western portions of the state. For various ecological reasons, the central and eastern portions of the state maintain this vegetative stratification. The amount of water adds another dimension of diversity, in that wetland areas are present. Fewer wetland areas or vegetative stratification exists in the western and northern parts of Texas.

Ecologically significant stream segments (Figure B4) are ecologically unique areas determined by TPWD based on biological function, hydrologic function, riparian conservation areas, high water quality (including aquatic life and aesthetic value), and threatened or endangered species. Significant stream segments are fairly well distributed throughout the central and eastern portions of the state.

Rarity layer

Oak Woods and Prairies, and Central Gulf Prairies and Marshes ecoregions show the highest levels of vegetation rarity. The pattern of these rare areas is indicative of riparian areas (Figure B5). This is particularly evident in the Mid Coastal Plains Western Section, and the

northern portion of the Oak Woods and Prairies ecoregion. In addition, the Central Gulf Prairies and Marshes ecoregion shows a high density of rare vegetation types.

The Rolling Plains, Cross Timbers and Prairie and Texas High Plains ecoregions have species with lower natural heritage ranks (Figure B6). Most of the areas that have high natural heritage ranks are located Chihuahuan Desert Basin and Range ecoregion, Edwards Plateau, southern Rio Grande Plain, Central Gulf Prairies and Marshes, and Southern Gulf Prairies and Marshes, ecoregions (Figure B6). The Rio Grande Plain along the border with Mexico constitutes the northernmost range of several subtropical species that exist principally in Mexico and Central America. The Big Bend area in the Chihuahuan Desert Basin and Range (due to diverse topography) and Edwards Plateau (due to karst features) are known as centers of high endemism.

There are several areas in Texas that show moderate and moderately high taxonomic richness, but only very few areas show the highest numbers of rare taxa (Figure B7). In particular, the Edwards Plateau is an area of high endemism due to the karst geologic features.

There are only very few areas that show the greatest number of rare species (or richness), including the Big Bend area of the Chihuahuan Desert Basin and Range ecoregion in west Texas, Sacramento-Manzano Mountains ecoregion (primarily the Guadalupe Mountains), Coastal Plains and Flatwoods Western Gulf Section, parts of the Edwards Aquifer and Rio Grande Plain scored in the highest percentage (i.e., most rare number of species) (Figure B8).

Sustainability layer

Calculation of contiguous land cover types shows that there are larger portions of these ecoregions with contiguous land cover types in the Rio Grande Plain, Chihuahuan Desert Basin and Range, Stockton Plateau, Edwards Plateau, northern portions of the Texas High Plains, and portions of the Rolling Plains (Figure B9). This may be due to larger unbroken tracts of a single land cover type (i.e., shrubland or desert community types) compared to other areas of the state. In the eastern half of the state, Blackland Prairie, Oak Woods and Prairie, and Mid Coastal Plain Western Section, there may be more different types of undeveloped land cover, but none are very large. These areas lack the connectivity of the west.

Figure B10 shows the locations where the perimeter-to-area ratio is small, and therefore ecological communities more sustainable. Land cover types with smaller PAR are scattered through the Rolling Plains, Cross Timbers and Prairie, Blackland Prairie, Oak Woods and Prairie, Mid Coastal Plain Western Section, Gulf Coast Prairies and Marshes, and Coastal Plains and Flatwoods Western Gulf Section. These areas are the top 1% with the smallest PAR and thus, more sustainable areas in Texas.

Areas that most closely match pre-settlement vegetation (Figure B11) and have been less disturbed by human activities are the Rio Grande Plain ecoregion, the Stockton Plateau, portions of the Edwards Plateau and Chihuahuan Desert Basin and Range ecoregions. The eastern portion of the state has been impacted more by human activity and the land cover types present do not reflect pre-settlement conditions (Kuchler 1964).

Portions of the Chihuahuan Desert Basin and Range, Stockton Plateau, Rio Grande Plain, Texas High Plains, and Coastal Plain and Flatwoods Western Gulf Section have the fewest

number of dams per HUC and therefore are more sustainable (Figure B12). Cross Timbers and Prairies, Blackland Prairies, and Oak Woods and Prairies have areas in the top 25% most sustainable areas in terms of waterway obstructions.

Road density (Figure B13) reflects populated areas and the means to connect them throughout Texas. For example, IH35 connects Austin, San Antonio, and Dallas-Ft. Worth. Consequently, this transportation corridor is well-developed with side roads and urban activities.

Figure B14 shows the buffered locations of airports in Texas. Large population centers, such as Dallas-Ft Worth and Houston, where there may be multiple airports are evident.

Several Superfund NPL sites are located near high population areas, including Houston, San Antonio, and Dallas-Ft.Worth (Figure B15).

The bulk of impacted stream segments not meeting their designated use (CWA Section 303(d)) are in the eastern half of the state where the majority of the water in Texas occurs (Figure B16).

Areas of poor air quality are located near the major cities in Texas: Houston, San Antonio, Dallas, El Paso, and Midland-Odessa (Figure B17).

Most of the RCRA sites are located near the major population centers in Texas: Houston, Dallas-Ft Worth, Austin , and San Antonio (Figure B18).

The population centers and much of the agricultural activities are in the Blackland Prairies, Texas High Plains, and Oak Woods and Prairies ecoregions. Additional urban and agricultural activities are scattered throughout the Rolling Plains, Mid Coastal Plains Western Section, and portions of the South, Central, and Eastern Gulf Prairies and Marshes ecoregion (Figure B19).